



URS

Perspective on Beyond Design Basis Event Analysis & Response

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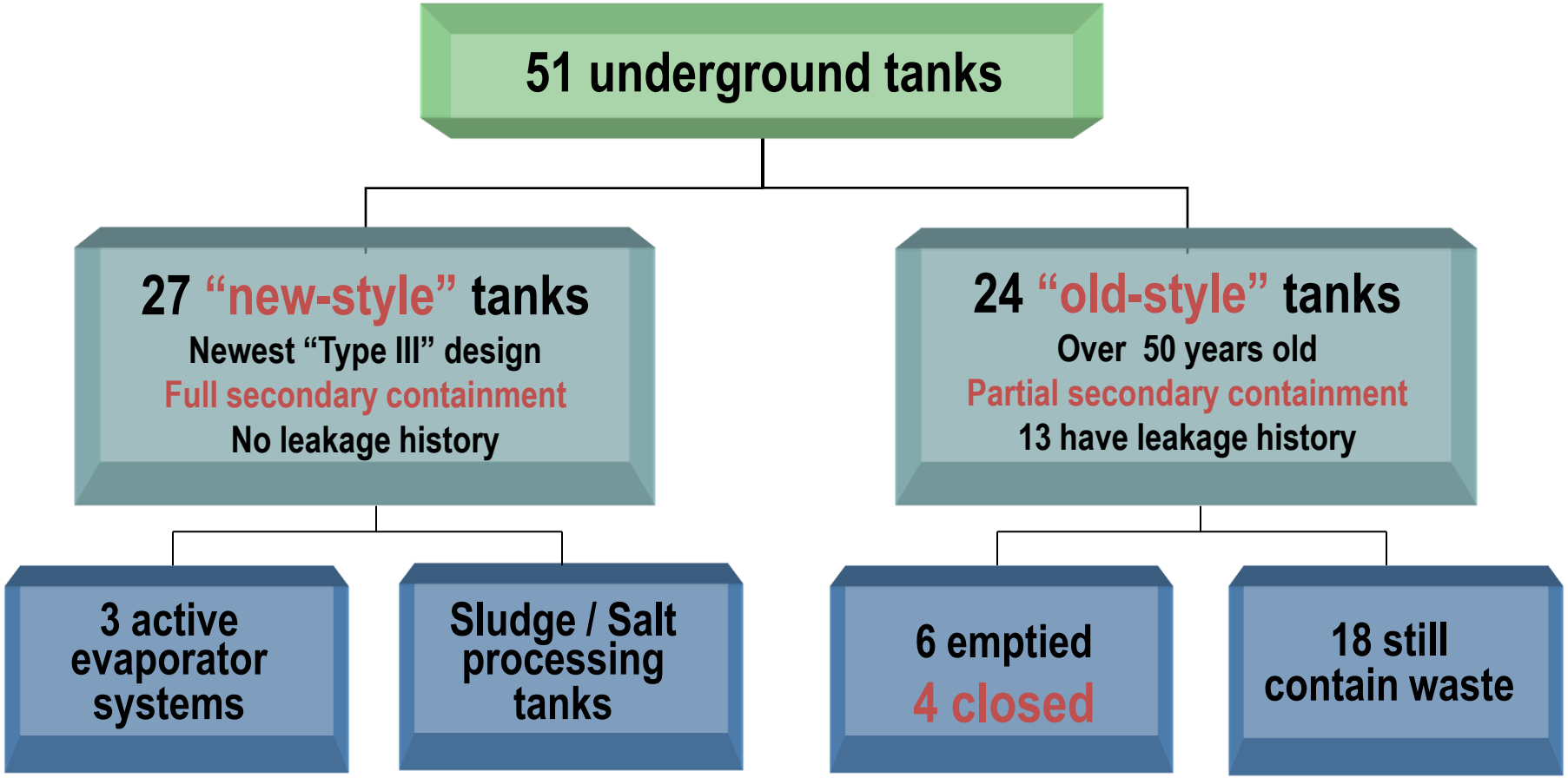
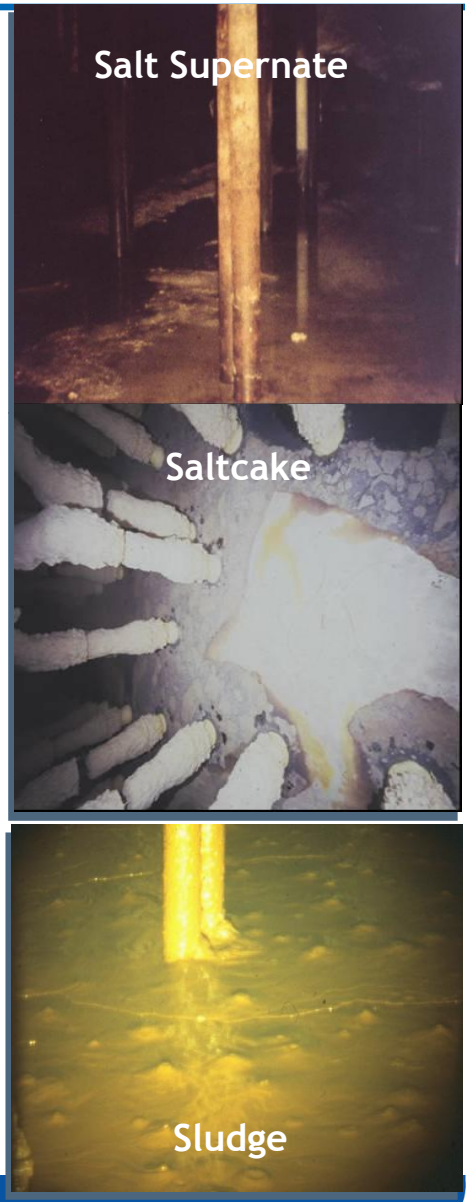
SRS Tank Farm System



SRS H-Tank Farm Description

Significant DSA Considerations

- **Waste Tanks can contain up to 1.3 Millions Gallons of highly radioactive waste (sludge, salt, supernate).**
  - Type III/IIIA Waste Tank Structures and berms are PC-3 Qualified.
  - Tanks may fail in a Beyond Design Basis Seismic Event.
  - Waste could flow above ground to streams and rivers.
- **Unmitigated Tank Explosion exceeds offsite Evaluation Guidelines**
  - Hydrogen gas can be trapped in the sludge and saltcake structure.
  - Seismic Event can cause a prompt release of trapped hydrogen.
  - It is not physically practical to install a ventilation system that can prevent the waste tank vapor space following a seismic release of hydrogen from reaching the LFL.
- **Many events that exceed 100 rem at 100 meters.**



Safety Basis Controls

- **Waste Tank Failure**
  - Type III/IIIA Waste Tank Structures are PC-3.
    - Programs to support PC-3 Structural, including Corrosion Control Program, Tank Top Load Program, Structural Integrity Program
  - Beyond Design Basis discussion credits the Spill Contingency Program
    - Uses bull dozers to construct berms, ditches to prevent spilled waste from entering Savannah River sytem.
- **Waste Tank Explosion**
  - Staged Portable Ventilations systems in PC-3 Structure.
    - Operators can install portable ventilation systems to prevent additional tanks from becoming flammable or reduce the hydrogen concentration.

Type III/IIIA Tanks in H Tank Farm were built at grade and then backfilled with dirt to provide shielding.

Beyond Design Basis DOE HQ Team Review

- **Team agreed with that the seismic event was the bounding event and the two release mechanisms (Explosion or Waste Tank Wall Failure) were the appropriate Beyond Design Basis Events.**
- **Team determined that the Waste Tank Structure and Portable Ventilation System Storage Building seismic qualifications were the Critical Safety Functions and should have a Level 2 Margin review (review against the PC-4 seismic event). Review of the Waste Tank Structure was not completed due to the limited time associated with the pilot. The Portable Ventilation System Storage Building by inspection was judged to meet this requirement.**
- **Team agreed that the Tank Farm Emergency Planning Hazard Assessment (EPHA) appropriately addressed Beyond Design Basis Events, and had the appropriate linkage to the Documented Safety Analysis (DSA).**
- **SRS has conducted drills involving multiple facility, evaluated loss of communication and SRS teams with outside organizations in preparation for responding to severe accident scenarios.**

SRS Tank Farm Evaluation

- **Based on URS Direction, SRR had previously determined what an estimated facility condition and response would be to a beyond design basis event.**
  - Evaluated concurrent releases happening following the BDBE.
  - Considered multiple initiators.
    - Bounding event was considered Seismic due to its impact on entire facility and other facilities on site including Emergency Operations Center.
  - Limited the scope of the facility damage to that which could be recoverable. If a structural failure would result in enough damage that the facility was rubble, then event was not postulated.
  - Assumed Station Blackout and total loss of communication.
  - Assumed failure of safety related equipment as well as process water, steam, power and air.
  - Focused on the development of a Response Strategy, including a response time line and ensuring conditions did not worsen.

SRS Tank Farm Evaluation

- **SRR Review Identified the following improvements:**
  - Procure/Install outdoor emergency lighting that does not rely on A/C Power
  - Procure and stage “Emergency Trailers” containing communications devices, respiratory protection, PPE, dosimetry, key procedures, key drawings, decontamination facilities, portable hydrogen monitors, rad/IH monitoring equipment
  - Develop alternate methods to stop Chromate Cooling Water siphon (another means of getting significant quantities of waste on the ground)
  - New transfer system designs should include passive siphon breaks
  - Evaluate need to stage Spill Contingency resources
  - Evaluate alternate methods for ventilating Tanks that takes less than 24 hours following a seismic event to become flammable.
  - Emergency Procedure improvements including:
    - Procedures built assuming support systems are available
    - Procedures built based on design basis lacks sufficient flexibility for BDBE
    - Procedures are not clear who has authority when communications with Senior Management is delayed and timeliness is important

Perspective

- **DOE Team brought in experts that concurred with our conclusions.**
  - Gave DOE and contractor more confidence that previous analysis was valid.
- **Acting as the last Pilot Facility provided SRS the opportunity to experience the most developed thought process on conducting the reviews and to influence the DOE Guidance.**
  - Having a non-reactor facility that does not have a "walk away strategy" provided valuable input in the DOE Guidance.
- **A year after the SRR Beyond Design Basis Event analysis was completed, the recommendations that required additional funding were not being pursude. The key action (an "Emergency Trailer") would support multiple sites or contractors.**
  - As a FAR Based contract, a contract revision would be necessary for this additional scope.
    - In the DOE System how is equipment that could support multiple facilities or site emergency actions funded? Who coordinates such an action? Who decides when such actions are warranted?

Perspective

- **The URS Review focused on defining the actions necessary to respond to the complete event, not only the releases that exceeded the offsite consequence value (25 rem).**
  - This review identified procedure changes and facility changes that support emergency actions in the facility.
    - Does reviewing just the Critical Safety Functions associated with offsite consequences of 25 rem identify everything necessary to ensure the facility can respond to the Beyond Design Basis Event?
- **If a Level 2 Margin review is recommended from the review, this Critical Safety Function evaluation would be documented in the Beyond Design Basis section in the DSA.**
  - Providing the upper limit to evaluate (i.e., one Performance Category (PC) or Seismic Design Category (SDC) above the design basis) is of value while determining a reasonable scenario.
  - Documenting this evaluation in the DSA will result in this becoming a design basis input.
    - This will result in future projects using the higher PC or SDC as design basis.